

Chapter 4

After the Storm

Operations DESERT SHIELD and DESERT STORM represented the largest movement of men and materiel since World War II. With the successful conclusion of operations, the focus of the logistics effort shifted from supporting combat and sustainment-related activities to redeploying personnel and recovering and redistributing the materiel from the Southwest Asia theater of operations (1:34).

A Logistics Success

At the height of DESERT STORM, over 500,000 US military personnel were stationed in Saudi Arabia and Kuwait (2:2). Over 95 million meals were served, enough to feed the entire population of the State of Rhode Island for one month. US forces consumed almost 1.5 billion gallons of fuel, an amount greater than the annual yearly consumption of 17 US states. US Service personnel received over 32,000 tons of mail, amounting to over eight million cubic feet—enough to cover 15 football fields to a depth of six feet. Supplies were hauled forward using 1,400 US Army trucks and 2,500 host nation vehicles. Over 3,600 convoys traveled almost 3,000 miles on main supply routes for a cumulative distance equivalent to driving around the world 1,800 times—64 million miles. Over 117,000 wheeled vehicles, 13,000 tanks and other tracked vehicles, and 1,749 helicopters were moved to the theater. Additionally, 350,000 tons of ammunition were forwarded to Southwest Asia (3:8).

Representative of the logistics success story that underlies Operations DESERT SHIELD and DESERT STORM, the figures also reflect the truly massive extent of the retrograde logistics effort required to remove the equipment from the theater and ultimately return it to combat ready status. The equipment, materiels, and supplies necessary to support effective air and ground combat operations demonstrate a successful logistics effort of unparalleled proportion. Yet, once hostilities concluded, the logistics effort was still unfinished. Arrayed across the desert were hundreds of thousands of US military personnel, immense stockpiles and inventories of munitions, foodstuffs, building materials, vehicles, rations, and spare parts.

Operation DESERT FAREWELL

The focus of the logistics effort for the previous seventeen months had been moving supplies and equipment to the theater of operations. However, when hostilities concluded on 24 February 1992, the entire logistics machine had to be thrown into reverse to facilitate a rapid withdrawal of US forces from the region. Less well known than Operations DESERT SHIELD and DESERT STORM that preceded it, Operation DESERT FAREWELL represented a logistics effort to return materiels, supplies, and equipment to pre-war stockage and readiness levels. It also entailed the sum of the efforts required to remove all traces

of the US presence from Kuwait and Saudi Arabia except as provided for in materiel prepositioning agreements.

Redeployment

The earliest phases of DESERT FAREWELL involved moving as many personnel and as much of their equipment as possible out of the theater in as little time as possible. The need to remove the large contingent of US forces from Saudi Arabian and Kuwaiti soil was fully in keeping with President Bush's pledge at the onset of hostilities to get US forces in and out of the region as quickly as events would allow. When President Bush announced on 6 March that hostilities were over, planes were already on their way towards Dhahran, Saudi Arabia, to transport US troops back home. By the morning of 8 March 1992, the first contingent of 5,000 troops was several hours into the first leg of its flight home. This 5,000 person a day stream was to continue until almost the entire 500,000 plus US personnel were back in the US. By 1 April, 165,000 US troops had been sent home. By 1 July, this number had reached 365,000 (4:155).

One of the most daunting portions of Operation DESERT FAREWELL, was the reconstitution of supplies and equipment used during the Gulf War. Wartime operating stocks consisted not only of equipment actually used during the war, but thousands of tons of materiel still loaded in containers in Saudi Arabia, neighboring Gulf States, and at ports in Europe and the US. Stocks actually issued to units for use, whether vehicles, munitions, equipment, shelters, supplies, or rations, presented even more difficult disposition decisions due to the varying states of deterioration found during inventory actions.

Plans and Challenges

Items were widely dispersed throughout the theater, and the rigors of heavy use, combat, and a harsh desert environment left some equipment completely unsalvageable. The remainder had to be collected, packed, transported to a central location, unpacked, inventoried, cleaned, and repaired (6:7). Whenever possible, assets were supposed to be returned to a 100% mission-ready status prior to movement from the Southwest Asian theater. However, this was next to impossible, as items ranging from combat damaged equipment to equipment ensembles were left less than mission ready due to shortages of supplies in the local area (6:7;1:36).

The challenge of the redeployment effort known as Operation DESERT FAREWELL was not only to redeploy the personnel, supplies, and equipment that the United States had spent 17 months moving to the Gulf area, but also to return the majority of the assets to a mission-ready status. The challenge of returning units to before-the-war readiness levels was exacerbated by personnel drawdowns and budget shortfalls.



US troops return to the United States. The first priority following the conclusion of the Gulf War was to return the troops home as quickly as possible. (Official US Air Force photo)

Redeployment

The first priority, both politically and militarily, for the United States following the conclusion of the combat phase of the Gulf War, was to bring the troops home as rapidly as possible. To live up to promises made both at home and to nations in the Gulf region, US military personnel were withdrawn as quickly as they could return to their assembly areas and obtain transportation. This haste in getting people out complicated the retrograde logistics scenario significantly, but it was an unavoidable consequence of the political realities of coalition warfare in the Gulf region.

With the exception of the Vietnam War, the United States military did not have recent experience with major retrograde operations. Furthermore, the retrograde scenario encountered in Vietnam differed quite markedly with the situation facing military logistics planners following the conclusion of the Gulf War.

The Vietnam retrograde was conducted while a high-intensity conflict was still in progress, and although a great deal of military equipment was evacuated to the CONUS or to other locations away from the theater of conflict, a substantial portion of materiel available in-theater was left for the use and support of the South

Vietnamese government after the withdrawal of US Forces (7:38). Ultimately, equipment evacuated from the theater and returned to the US was gradually overhauled over the course of several years and used to minimize the effects of equipment procurement shortfalls that occurred during the lean budget years and military drawdown following the US withdrawal from Southeast Asia (7:39).



Helicopters prepared for return shipment to the United States. The protective wrapping seen here was necessary when the return was via sealfit. (Official US Air Force photo)

Changing Logistics Focus

In the case of the Gulf War, despite victory and the sudden cessation of hostilities, the logistics effort continued unabated. The logistics focus shifted throughout the operations, from active support of tactical combat operations to sustaining the combat forces charged with clearing enemy forces from Kuwait, and then to redeploying forces out of the theater (3:6). This was to constitute a significant effort in keeping with the promise by President Bush to the world community and, particularly, to the Arab states of the Persian Gulf area, to get the job done as quickly as possible and then rapidly disengage US forces and withdraw them from the region.

Redeployment Plan

During the time the United States was preparing for Operation DESERT STORM, agreements were being made between the US and Saudi Arabia. One of those agreements was that the US military would make a quick exit from Saudi Arabia after the war and would remove the equipment and supplies brought in to support this operation. Colonel Randy Geyer, of the CENTCOM logistics staff, had voiced his opinion that the preliminary plans for redeployment were weak. Based on his observations, he was tasked with developing a more comprehensive plan for redeployment. The new plan called for a two-stage approach. Stage I would be a personnel redeployment set up to move 365,000 troops in 90 days. Stage II would account for, segregate, and load for shipment, all of the supplies left behind by the departing forces. It allowed for a time frame of a year or more in which to accomplish this task (4:150).

From their onset, redeployment operations encompassed the return of both materiel and personnel. Preparations for the redeployment of equipment required all materiel items be thoroughly cleaned and inspected to remove any potential contaminants prior to shipment out of the theater. Staging and wash facilities were established at Dammam, Dhahran, Al Jubayl, and King Khalid Military City—facilities that became the major collection and staging points for equipment and materiel awaiting subsequent redeployment (3:6).

As logisticians struggled to get a handle on the immense quantity of materiel in the logistics system, they came to the realization that while it was next to impossible to determine the overall tonnage or volume of materiel that required retrograde, for the most part it consisted of two broad categories—undelivered cargo and distributed materiel.

Undelivered Cargo

The majority of undelivered cargo was in 40-foot seavan containers and, for the most part, had never actually been released from the ports to the supply distribution system in theater. In addition, thousands of seavans had been “landed short” in Egypt, Spain, the United Arab Emirates, and several other European countries, due to the massive backlogs at the Saudi Arabian ports. Thousands more were either awaiting unloading or were stacked at the ports of Dammam and Al Jubayl when hostilities ceased.



Cargo awaiting disposition in a cargo marshalling area. (Official US Air Force photo)

While the problem of distributed cargo was one that would occupy the majority of the logistics staff's time and effort, the problem of undelivered cargo was more readily solved. At the direction of the theater logistics commander, Lieutenant General William G. Pagonis, US Army, all short-landed containers coming direct from vendors were returned to their point of origin or to a Defense Logistics Agency (DLA) designated storage facility. Containers destined for units that had already redeployed were forwarded to the unit's home location.

This action effectively removed a sizable concern from the theater planners. This in turn allowed them to concentrate on opening and inventorying containers already landed in Saudi Arabia and collecting and categorizing the substantial volume of distributed materiel that was flowing into theater collection points at a steady rate (1:35-36).

Distributed Materiel

Moving the materiel to the collection points was a major aspect of retrograde logistics operations. One solution to this problem was found in the US Army's 711th Transportation Group (Provisional) which was created to address the need for line-haul transportation in support of retrograde materiel movements following the conclusion of hostilities. Consisting of three subordinate battalions, the 711th controlled a fleet of over 2,500 assorted tractors, flatbed trailers, lowboy trailers, heavy equipment transporters (HETs), and additional miscellaneous light and heavy transportation vehicles. A majority of all the vehicles used to support retrograde line-haul operations were supplied through contracts with host-national companies and their personnel. As retrograde operations moved into full swing, the surface theater transportation plan called for movement of 1,056 flatbeds and 520 lowboys or equivalent HETs on a daily basis. This volume of traffic was heretofore unimaginable to Army planners. The mission called for the equivalent of 22 medium and 12 heavy truck companies, a number almost twice as large as the size of the Army's entire 37th Transportation Command (5:18-19).

The distances and conditions under which trucks and equipment were required to operate were extreme. Vehicles making a typical round trip covered over 600 miles of hazardous roads in extremely high temperatures. Dust, blowing sand, sandstorms, and smoke were daily inconveniences. Due to the variety of equipment types utilized, there was little interchangeability among vehicles and a system of trailer transfer points was not possible. Drivers were required to drive entire routes themselves over the course of several days. The majority of drivers provided by Saudi contractors were third country nationals speaking little or no English (5:18-19). Though capable drivers, cultural differences sometimes complicated the lives of logistics support personnel. Army ordnance personnel were particularly concerned with a typical driver practice of cooking meals on a small propane stove in the area immediately adjacent to the driver's vehicle. Ordinarily not a significant concern, the practice gained considerable attention when the trucks were loaded with tons of high explosive ordnance (5:20).

Despite the existence of a highly-detailed transportation plan, limitations in the logistics system were quickly realized. Trucks had to wait daily in long queues at heavily congested loading and unloading sites. Most significant of all, the availability of materiel handling equipment, container handling equipment, and qualified personnel to operate the equipment significantly affected operations. In addition, convoys were extremely large, typically over 100 vehicles spread over ten miles of difficult roadway. Without the benefit of communications, effective convoy control by the single Army NCO and assistant was less than ideal during the majority of movements.

Despite such limitations, the 711th Transportation Group achieved the objectives for which it was constituted. From 16 August to 15 November 1991, the 711th traveled over 13 million miles. Trucks under the unit's control moved over 260,000 short tons of supplies, 12,000 tracked vehicles, and 6,400 containers (5:21).

Morale, Welfare, and Recreation

Supporting commanders at the staging areas were particularly attentive to the morale and comfort needs of redeploying personnel, many of whom had been living in extremely austere conditions since their initial deployment to the region. Morale, welfare, and recreation items were made available to redeploying personnel in addition to more basic commodities to provide for their everyday needs while awaiting outbound transportation. Popular wherever they were located, "Wolfburger Stands," were just as popular when made available to troops in the redeployment areas (3:6).

Restoration of Kuwait

As combat operations ended, the task of attending to the severe damage inflicted on both the people and facilities of Kuwait began. Under the auspices of the US Army's 22nd Support Command, Camp Freedom was established in Kuwait to serve as the focal point for theater restoration operations. Humanitarian efforts were expanded to encompass refugee camps operated by US forces in Southern Iraq and to include primarily Kurdish filled

camps in Northern Iraq and Turkey. In addition, the US had to attend to the needs of over 60,000 enemy prisoners of war (EPW) taken during combat and immediately following the cessation of hostilities. Held in four camps, prisoners were to be provided shelter, medical attention, rations, and water, until they could be processed by the International Red Cross for placement under Saudi Arabian control (3:6).

Although the majority of combat forces were redeployed out of theater from March to May, 1992, most of their materiel was left behind in the desert or at the designated staging areas. The US Army alone left behind over 100,000 wheeled vehicles, 10,000 tracked vehicles, and 250,000 tons of ammunition (3:6). The extraordinary task facing logistics personnel was closing-out the theater by efficiently, effectively, economically, and safely moving this materiel from where it was left to the staging areas and subsequently to final destinations. In the words of one Army specialist, this phase primarily centered on "bringing the iron out of the desert." For the US military, this was new logistics ground because never before in this century have US forces actually closed out a theater (3:6).

Fresh Forces

Given the adversity faced by logistics personnel during the seventeen months of operations DESERT SHIELD and DESERT STORM, and the generally austere logistics infrastructure that existed within Southwest Asia both before and after the Gulf War, one of the first objectives undertaken by the US Army's 22nd Support Command was to deploy approximately 6,000 new personnel into the theater to support retrograde operational requirements. In a similar vein, the other military Services augmented or replaced their existing logistics personnel with fresh, mostly volunteer, personnel from the United States. Not only did these newly arrived personnel provide badly needed logistics support as the number of personnel available for logistics duties rapidly decreased, but they provided a welcome replacement for many individuals who had been in-theater for 12 to 17 months (3:6).

Long-Term Vision

Operation DESERT STORM required the use of supply stocks from many different locations around the world. A part of the long term vision guiding the logistics effort was the desire to return equipment from the theater to those facilities that had been depleted over the course of the war. Military bases in Europe, Central America, South America, and Asia had sent supplies to help build up the stockage levels required to prosecute the wartime mission. These bases needed to have these supplies replaced and redeployment efforts attempted to accomplish this whenever feasible. Another part of the vision was to help Kuwait by sending some of the supplies to assist in sustaining the general populace and repairing the decimated national infrastructure. Additional materiel was repacked onto maritime prepositioning ships that then returned to their ready positions in the Indian Ocean (4:156).

Another part of the vision was to effectively dispose of dated materiel such as meals ready to eat (MREs) and similar items.

Food, fuel, water, and medical supplies were provided to the Kuwaitis following the war. This materiel would have to be packed and removed anyway but would have ended up being destroyed if it were returned to the US. Operation PROVIDE COMFORT, the UN relief effort to assist and protect Iraqi Kurds fleeing a hostile Iraqi regime, also allowed for the practical disposal of shelf-life limited items that would have been otherwise destroyed. Sending items such as tents, cots, blankets, water, excess MREs, and tray packs to the Kurdish refugees fleeing Iraq, as well as helping other needy populations around the world with surplus food and clothing, was an effective and useful method of disposition (4:154).

To support a portion of the Air Force retrograde logistics effort, Air Force Materiel Command formed the 4401st Asset Reconstitution Group (Provisional) for the express purpose of attending to the Air Force's share of the military equipment, supplies, and munitions left over from the war. For the Air Force, the key collection facility was Al Kharj, Saudi Arabia. Literally hundreds of jeeps, pick-up trucks, Humvees, trailers, graders, fire trucks, and cars still formed regimented rows in the blistering desert sun almost two years after the fighting officially ended. In addition to vehicles, Air Force personnel had to contend with portable buildings, hangars, and tents. Virtually anything a unit could not immediately take with it when it redeployed eventually found its way to Al Kharj (6:6).

Other Considerations

Regulations imposed by the United States Department of Agriculture were an additional constraint on the retrograde logistics effort. Found in the Code of Federal Regulations (CFR), these regulations governed the importation of goods into the United States from any foreign location and set stringent guidelines that significantly affected the ability to return the massive amounts of equipment and supplies that were sent to the Middle East. These regulations are intended to prevent the accidental importation of crop-infesting insects that may be living in soil or sand residue found in or on the vehicles or other equipment. The regulations require that items returned to the United States must first be steam cleaned and sanitized. To "clean" the equipment for transportation back to the US, a huge logistics undertaking had to be accomplished to prepare the items for shipment (8:All).

Washrack Units

To meet the requirements imposed by the Department of Agriculture, all loose soil and sand had to be removed from the vehicles prior to returning to the US. As a result, four washrack units were set up to clean and sanitize the vehicles. Over 2,000 vehicles (air and ground) were washed each day, some of which had to be taken apart.

In some cases engines were removed and tracks were taken off M1 tanks in order to ensure they would be acceptable for return to the US. In order for these washracks to operate, water was brought to the sites by truck or pipeline, asphalt was laid to support the vehicles being cleaned, and sterile staging areas were built to store equipment until it could be shrink wrapped and held for transportation.



Vehicle cleaning at one of the port wash facilities. (Official US Air Force photo)

In addition to all of the vehicles that needed to be cleaned, ammunition was also required to undergo the same treatment. Some 350,000 short tons were sent through the washracks prior to shipping. The washrack operation constituted the largest single operation during DESERT FAREWELL (4:157).



Prior to return to the United States, or other destinations, equipment had to be cleaned. In this photo trucks are being prepared for return shipment. (Official US Air Force photo)

Theater Close-Out

The close-out of the theater by the US Army can essentially be divided into two distinct phases. Phase I, from June to mid-August 1991, consisted of the build-up of 61 provisional units using primarily replacement personnel. In concert with six active Army units from Forces Command and four terminal transfer units, these units replaced 71 in-theater units that had ongoing missions. The replacement units were put in place and trained to do the jobs of their predecessors. The organizational structure of theater logistics support forces was also reconfigured to more readily support the retrograde logistics mission (3:6).

As an additional part of the first phase, massive equipment and munitions stockpiles left in the desert were sorted and organized for retrograde disposition. In staging areas, required

transportation assets were marshaled to move stockpiled materiel to the port cities of Dammam and Al Jubayl. In all, nearly 50,000 truckloads were required to transport the massive quantity of retrograde materiel to the ports. Over 400 shiploads subsequently were required to move materiel from the theater back to the United States. Once returned to the US, the majority of the salvageable equipment required extensive refurbishment due to combat, the harsh desert environment, and shipment by sea (3:7).

Phase II of the close-out extended from mid-August until mid-December. During this phase, the three main activities were: withdrawal of materiel from the theater; the storage of prepositioned equipment and theater stocks in Doha, Kuwait; and drawdown of provisional units and personnel in-theater. Units including Patriot missile batteries redeployed from Kuwait to Saudi Arabia as a precursor to their subsequent withdrawal from the theater. Throughout the late fall and early winter, withdrawal of materiel and equipment continued. By 31 December, the majority of supplies, with the exception of ammunition, had been withdrawn and redeployed.

New Agreements

In keeping with a number of new and existing agreements with host Persian Gulf nations, equipment and supplies were moved to a number of prepositioning sites. This prestocked equipment and materiel provided the United States with an exceptional capability to support exercises and contingency operations in the region. In addition, as a result of a new host-nation agreement, a permanent organization known as the Combat Equipment Group, Southwest Asia, was established in Doha, Kuwait, to manage and maintain prepositioned materiel and equipment stocks. By late October, US Army provisional units began to stand down, with a caretaker command, Army Central Command (ARCENT) Forward established to oversee residual operations through at least June 1992 (3:8).

The final phase of the Army's theater close-out consisted of moving what remained of ammunition stockpiles to ports or collection points and either shipping it from the theater or destroying it at destruction facilities. The numbers of provisional units and support personnel continued to decrease until ultimately only the permanent organizations at Doha and Dhahran remained, with all other personnel withdrawn and all other facilities closed. Remaining in-theater were several Patriot missile batteries, the US Military Training Mission based in Dhahran and Riyadh, the US Army, Kuwait, and prepositioned stocks of equipment and materiel in Kuwait and Bahrain.

Reconstitution

Efforts aimed at redeploying personnel and equipment out of the theater were begun almost immediately following cessation of hostilities. These activities included preparing materiel for redeployment, shipping the materiel back to home unit locations, and eventually receiving items back at home stations. Once units and the majority of their equipment began arriving back at their US bases, equipment had to be inspected, initial servicing and repairs performed, property accountability established, and

supply support activities reestablished. A substantial effort was also required to update unit maintenance management systems to reflect the pressing requirements for beyond routine maintenance required on much of the equipment returning from the theater (9:18).

Even with the eventual return of the majority of US warfighting materiel from the theater, the logistics challenge was far from over. For the majority of the equipment, the exposure to the environmental effects of operating in the arid desert climate of Southwest Asia and of traveling to and from the theater by sea promoted significant degradation of the equipment's readiness for future combat operations. Despite the Herculean sustainment efforts carried on throughout the Gulf War, a major reconstitution effort was required by the majority of participating units. The experiences of the US Army's 1st Infantry Division (Mechanized), the "Big Red 1," in reconstituting unit readiness and warfighting capability are typical of those experienced throughout the US military following the conclusion of Operation DESERT STORM.

Brigadier General James F. Brickman, Commander, 1st Infantry Division (Mechanized), defined post-redeployment reconstitution as:

"those extraordinary regeneration actions that are planned and implemented to restore units to a desired level of combat effectiveness in line with peacetime mission requirements and resources. These actions transcend normal day-to-day force sustainment and require Army-wide support in many areas" (9:18).

Managing Excess

Management of repair parts stocks was considered the first major challenge facing the division upon its return to Fort Riley, Kansas. A factor complicating the management situation, and fairly typical of the problems facing many of the units redeploying from Southwest Asia, the division's authorized stock of repair parts was not among the first of the division's shipments to be returned from the theater. Thus, at the very time that the division was trying to initiate a major reconstitution effort, it was hampered by the fact the spare parts it required were somewhere between the port of Dammam, Saudi Arabia and Fort Riley, Kansas. Division commanders found themselves critically short of some essential items, but also buried in excess of others. Ordering additional stocks of repair parts required in the short run to replace stocks still in transit from Saudi Arabia, quickly turned to excess as shipments from the theater began arriving over several months. In many cases, parts were ordered from the wholesale system when those parts were already stocked in a unit's authorized stocks, although spread out in redistribution channels between the theater and Fort Riley. In addition, the requisition and shipping times required to obtain items through the wholesale system resulted in equipment being "deadlined" for a lack of parts, costing the division a loss of mission-capable days (9:20).

Parts Influx

Over a three-month period following their redeployment from Saudi Arabia, receiving facilities at Fort Riley were inundated by two and a half times their normal daily volume as units requisitioned required repair parts and supplies. A key lesson learned by Army planners was that operating parts stocks should be among the first items redeployed so they will be available to support equipment as it arrives.

Commensurate with this, planners also agreed that elements of the main support battalion should also have been redeployed ahead of the bulk of the division in order to be available to manage equipment and materiel as it arrived back at the home station (9:20).

Units Assume Supply Responsibility

As units began to get their normal supply and maintenance activities back on line following redeployment, the potential for a bottleneck at the division level parts supply facility was quickly recognized. To avoid this, receiving activities and parts management were temporarily pushed down to the unit level while excess items were simultaneously processed up and out of the division through the centralized supply activity. Thus, units were instructed to identify, retain, account for, and use repair parts on hand at the unit level until notified to resume normal supply procedures (9:20).

Given the potential volume of unnecessary parts stocks, cancellation of due-in supply excess (orders for supplies that were no longer needed) was a high priority for unit planners. The objective was to cancel excess early enough to prevent unnecessary items from being shipped from the depots and thus save funds. A major supply reconciliation revealed the existence of over 22,000 requisition documents for parts that had been shipped to Saudi Arabia, but not received. From July 1991 through February 1992, 1st Infantry Division (Mechanized) supply personnel canceled orders for over \$60 million dollars in excess due-in parts.

As equipment began to arrive back at Fort Riley, thorough technical inspections to identify spare parts and servicing requirements were undertaken. Even this seemingly simple task required almost 45 days of virtually around-the-clock operations. The bulk of the division's equipment was in substantially worse shape than had been expected.

Additional Servicing Required

Division equipment had been serviced prior to departure from Southwest Asia, including the required sanitation procedures required to prevent potential agricultural and soil contamination. However, these services were often performed at below standard levels using modified procedures due to the harsh desert environment, unavailability of required parts or supplies, the limited time available for service, or usually, some combination of the above. With this in mind, many service-related repair parts, supplies, and petroleum products were ordered while the unit was

still in Saudi Arabia to ensure their availability when the unit arrived back at its home station following redeployment. This forward thinking saved the division significant downtime and allowed a more rapid recovery pace than would have otherwise been possible (10:31).

Equipment Accountability

One of the final logistics readiness challenges facing the 1st Infantry Division was accountability of the unit's real property and equipment. Waste and destruction of property are inevitable consequences of combat. However, modern equipment accountability requirements dictate that accurate inventories be established and maintained. Thus, a substantial effort was required to identify equipment that had been destroyed or lost during the unit's operations in the desert, and to adjust reported inventories and accountability documents as required. This seemingly mundane task was of extreme importance to at least some of the division's personnel as more than one supply officer found himself accountable for several million dollars of "missing" equipment.



An M1A1 tank. Returning weapons such as this to their units as quickly as possible was a major reconstitution concern. (Official US Air Force photo)

Seldom was such equipment really missing, but its disposition had to be determined and the assets and the accompanying paperwork had to be appropriately reconciled to rebalance supply accounts. As might be expected, some units found themselves with far less than they were authorized while others found themselves far better equipped than when they initially deployed—and, than their authorized equipment lists would allow.

The problems involved in achieving accurate inventories were not at all trivial. The fact that the 1st Infantry Division's equipment arrived back in the US over a period of many months meant that no wall-to-wall inventory was actually possible until well into the reconstitution effort. However, once such a 100% inventory was actually accomplished by all division units, an aggressive program of lateral transfers and turn-ins eliminated inventory disparities while simultaneously avoiding an overtasking of already saturated central supply functions.

Reestablishing Supply Channels

A final hurdle confronted by the Big Red 1 centered on the need to reestablish normal, non-wartime, supply channels. When it deployed to Southwest Asia, the 1st Infantry Division effectively dropped from routine Army supply channels. As the unit's supply requirements were addressed through the contingency channels that developed as a part of the DESERT STORM sustainment effort, the computerized database that the Army uses during peacetime to support all Army units was no longer updated with the division's data. This seemingly minor glitch would, however, result in near chaos once the division was redeployed and attempted to reengage the normal supply system. The inaccuracies in the supply system database, coupled with changes to the system that were completed while the unit was deployed, resulted in a situation where the supply system refused to recognize the division's requirements. As a result, the wholesale supply system routinely rejected and canceled the division's requisitions. This problem would plague the division's reconstitution efforts for almost a year following redeployment and was overcome only through the use of innovative work-arounds at both the Big Red 1 and higher headquarters (10:33).

Delayed Desert Damage

Following redeployment from Saudi Arabia, it was readily apparent to the US Army Tank and Automotive Command (TACOM) in Warren, Michigan, that the environmental impacts of Operations DESERT STORM and DESERT SHIELD on the Army's tracked and wheeled vehicle fleets were substantially greater than anticipated. In response, TACOM initiated its 3D (Delayed Desert Damage) program to determine the full extent and causes of desert related damage, determine appropriate corrective maintenance requirements, and estimate corresponding man-hour and supply system effects of the increased equipment maintenance requirements. At the onset of the program, a sample of 30 different tracked and wheeled vehicles used during the war were run through extended depot level maintenance procedures.

Worse Than Expected

Initially, vehicles were run through standard depot inspections as well as normal teardown and maintenance. Depot personnel were then instructed to conduct a more extensive analysis to determine whether normal depot procedures were sufficient to fully detect all hidden damage and maintenance requirements. During the subsequent inspections, depot personnel found more unanticipated damage that would have gone undetected through normal depot procedures.

Most startling were three transmissions that had operated successfully during road tests and passed pre-shop analysis on dynamometers. Further breakdowns of these transmissions revealed sand and corrosion and filtration or lubrication problems had compromised all three to the point of certain premature failure. Clutch plates were worn beyond tolerances due to the presence of sand. Two gears in one of the transmissions were welded together because of the extreme heat generated by contamination.

Extensive depot inspections also revealed road-arm leakage and road-arms with large amounts of sand both inside and out. Deposits of sand, dirt, and water were found in brake chambers. The teams found sand in axle assemblies, starters, alternators, and virtually every engine and transmission. Depot and TACOM technicians found in-tank fuel pumps still operating but with sand and dust all over them. Heater boxes were covered with sand inside and out. Various signs of burning, scoring, metal stress, viscosity breakdowns of lubricants, and dilution of fuel with water and sand were almost universal among the sample vehicles (11:25-26).

While TACOM's specific analysis was directed only at the US Army assets under its control, the factors which caused the extensive damage encountered during the depot evaluation were certainly common throughout the Southwest Asian theater of operations. Hence, the other Services encountered similar levels of unanticipated delayed desert damage throughout the DESERT SHIELD/DESERT STORM reconstitution process. In fact, given the extent of the potential damage, it is quite likely the full extent of the delayed effects of US involvement in DESERT STORM on equipment and materiel was not fully realized for years until those effects showed up as the premature aging and deterioration of assets involved in the Gulf War. The Defense Logistics Agency (DLA) and the US Marine Corps both initiated similar programs to combat the delayed effects of desert theater warfare. The Marine Corps program—"Saudi Arabia Non-combat Damage," or SAND, was established at Corps logistics bases in Albany, Georgia, and Barstow, California (11:27).

Climate and OPTEMPO

In the final analysis it is clear that two factors clearly compounded the detrimental effects on equipment associated with desert warfare. First, the ground portion of the war involved a sizable increase in the operating tempo (OPTEMPO) of the equipment involved. Usage rates were from 10 to 40 times the

normal operating rate for given vehicle classes within the fleet. This sustained rapid pace of operations would be sufficiently grueling even under optimum conditions but was worsened by the fast moving combat environment of Operation DESERT STORM. Second, the extraordinarily difficult terrain, excessive desert temperatures, and airborne sand took its toll on equipment. As US planners learned through experience, the sand in Southwest Asia is much finer than that which Westerners are accustomed. “It is more menacing. It penetrates. Any breach in seals or filters invites sand to enter” (11:27). In the desert environment of Southwest Asia, filters were often ineffective or clogged quickly. Engines rapidly overheated. Quick fix activities become necessary to repair equipment as rapidly as possible before further contamination occurred (11:27-28). An important facet of combat operations that was reemphasized during the 100 hours of ground combat during DESERT STORM is well worth noting:

Clearly, the operational tempo of DESERT STORM, compounded by the Southwest Asia environment, stretched the limits of American tank-automotive equipment. One last consideration impacting delayed desert damage is the fact that, as the operational tempo went up, maintenance decreased (11:27).

Although DESERT STORM was a short war, the materiel degradation was substantial. The implications for sustained logistics and combat operations over a span of months versus the 100 hours of actual ground combat in DESERT STORM should signal a clear message to logistics planners: maintaining equipment readiness in adverse climatic conditions will require a total logistics effort—an effort that will tax both the sustainment and retrograde systems to the utmost.

DESERT SWEEP

When hostilities ended, a major challenge that still faced coalition allies and the nation of Kuwait was in disposing of munitions remnants of the desert war. The war left literally millions of tons of unexploded mines, aerial bombs, and submunitions littered in the Kuwaiti desert. In addition, immense stockpiles of salvageable munitions, thousands of inoperable tanks and trucks, and abandoned bunkers and revetments were scattered throughout the theater. The danger from these wartime leftovers was very real indeed; the Kuwaiti government estimated that as of 13 October 1992, over 1,500 civilian casualties had occurred as a result of the deadly litter left after the Iraqi occupation and the subsequent allied offensive (12:4).

To return the desert to its pre-invasion condition, Kuwait requested allied assistance and divided its territory into seven sectors. Seven allied countries that took part in the war were then requested to clear a sector under contract to the government of Kuwait. These countries, the United States, Great Britain, France, Egypt, Bangladesh, Pakistan, and Turkey, then set about the dangerous task of clearing the desert within their respective sectors. Countries like Egypt chose to use military personnel to

accomplish the dangerous task in much the same manner ordnance has been cleared since before World War II. Others, including the US, contracted the clearing effort to private companies.

Contracted Support

Within the US sector, Conventional Munitions Systems, Inc. (CMS), was selected to clear the 3,126 square kilometers (1,207 square miles) of desert, including 146 square kilometers (55.2 square miles) of minefields. By way of estimates, it is believed that a third of the approximately 100,000 tons of explosives dropped by the allies over Kuwait never exploded, either because they were duds or were swallowed by the sand (12:4). Conventional Munitions Systems’ vice-president for planning and coordination, Alfred L. Dibella, Jr., conservatively estimates that more than one million dud submunitions from Rockeye aerial bombs littered the US sector alone (13:54).

Deadly Litter

Dibella believed that at least 100,000 tons of Rockeyes were dropped during the war, with each Rockeye containing at least 250 submunitions. That means that 25 million bomblets were dropped by allied aircraft—“with a dud rate of 5 percent, which is a very low estimate, there were at least 1,250,000 unexploded Rockeyes in the desert” (13:54).

The presence of such a vast quantity of unexploded ordnance in the desert forced US personnel on seemingly less dangerous recovery and transportation missions to be routinely accompanied by expert explosive ordnance disposal (EOD) personnel. The presence of undetected munitions was a major threat to US logistics personnel working to retrieve assets from the desert. In fact, the presence of munitions combined with already hazardous desert terrain, made some areas inaccessible (14:14).



Mine clearing the old fashioned way. This was one of many ways used to find and remove mines at the conclusion of the Gulf War. (Official US Air Force photo)

Mines and Other Dangers

Munitions dropped by coalition forces were not the only hazardous obstacles facing CMS and its crews. Iraqi forces laid an estimated 500,000 mines in 16 different varieties within the borders of Kuwait during their 17 month occupation of Kuwait.

Not only did Iraq seed the desert with anti-tank and anti-personnel mines of its own design, but also with varieties manufactured by Italy, Belgium, Russia, China, Czechoslovakia, Great Britain, and Pakistan.

Fortunately, CMS personnel found that their already dangerous work was not complicated by Iraqi booby traps (13:54). However, exposure to the elements has caused many munitions to become unstable. One US technician, a former EOD instructor with over 20 years experience, was killed when an artillery shell exploded unexpectedly under routine handling (12:4). More than 50 sappers, as the EOD technicians are known, were killed in Kuwait during the cleanup effort. Dozens more have been seriously injured, including Kuwait's entire five-man EOD team. "This stuff is very unforgiving," said Floyd D. Rockwell, a retired US Army master sergeant now serving as a disposal technician with CMS (12:4).

In addition to the rigors of removing leftover ordnance, sappers and laborers working near the Iraq-Kuwait border often had to deal with hostile Iraqi border patrols that routinely fired over their heads as the crews conducted their ordnance sweeps. One US technician, Clinton A. Hall, was taken prisoner by Iraqi forces for three days in early October when his duties carried him too close to a roving Iraqi patrol (12:4).

New Technologies

CMS personnel used a variety of state-of-the-art systems to clear ordnance contaminated areas. They used the Navstar/Global Positioning System (GPS), to precisely pinpoint and survey mine fields, munitions caches, and other contaminated areas. Most of the Iraqi minefields were laid in precise patterns so mapping was relatively easy once the areas were located. Rockeye bomblets however, were widely and irregularly dispersed so the task was more difficult. Using GPS, technicians plotted ordnance locations using an eight-digit grid code that told which EOD team located the ordnance, the sector in which they were located, the type of ordnance involved, and the approximate number of each type found. The 26 GPS receivers and the plotting system utilized by technicians to precisely mark

and plot dangerous areas were part of a program known as the minefield and ordnance recovery system (MORES) (13:54).

Once mines or bombs were located, they were disposed of by a variety of means depending on their type and general location. Air delivered munitions such as Rockeye bomblets were generally destroyed in place, but CMS investigated the idea of using robot sappers to collect the unexploded ordnance for delivery and destruction at a centralized site. Mine fields were originally cleared by blowing up the mines in place. This practice proved unsatisfactory, however, as detonations tended to cover-up nearby unexploded mines with sand displaced by the explosion. Mines were subsequently manually disarmed, collected, and moved to a central destruction site for disposal (13:55).

Locating mines was made easier by CMS's adoption of a state-of-the-art 13.4-pound, handheld metallic mine detector as a replacement for the US Army's vintage standard detector which had seen service for over 30 years. Ground penetrating radar capable of detecting munitions up to eight feet below the surface, and airborne and spaceborne synthetic aperture radar were also used to scrutinize the region for hazards (13:55).

The sheer volume of unexploded ordnance available made the Kuwaiti desert a virtual laboratory for development and evaluation of new and refined EOD techniques. Concentrations of Rockeye submunitions were destroyed using a foam substance that hardens on contact and becomes explosive as it hardens. Binary liquid explosives sprayed on contaminated areas which form an explosive slurry of sand and munitions were also used (13:55).

Captured Ordnance Stocks

Not all the munitions found in the desert were duds. In addition to thousands of smaller caches and ammunition dumps scattered throughout the desert, at least five Iraqi underground munitions storage sites were discovered. Containing a total of one million tons of serviceable Iraqi munitions, these sites were carefully salvaged and used to augment Kuwaiti military stockpiles (13:54).

The job of cleansing the desert of its deadly litter was an enormous task. The \$134 million dollar contract was expected to keep CMS and its employees busy for five to seven years. One of the problems that extended the clean up effort, was the inaccessibility of areas located under the large oil spills created when retreating Iraqi forces set the Kuwaiti oil fields ablaze.

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